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COMPLETE SPECIFICATION

Skin Conditioning Composition

We, WARNER-LAMBERT PHARMACEUTICAL COMPANY, a corporation organized under the laws of the State of Delaware, United States of America, of 201 Tabor Road, Morris Plains, New Jersey, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to cosmetic preparations and to cosmetic preparations containing a new and novel composition of matter highly effective in conditioning the human skin and in retarding the rate of moisture loss therefrom.

The human skin is made up of several layers including the dermis or living skin and the epidermis which includes stratum corneum or outer horny layer and a thin barrier layer immediately beneath the stratum corneum. In the normal functioning of the skin, moisture is continuously released from the dermis and this moisture migrates through the barrier layer into the stratum corneum from which it is lost by evaporation. It has been observed that the rate of migration of moisture from the dermis through the barrier layer is frequently appreciably less than the rate at which moisture is lost from the stratum corneum. This difference becomes progressively larger as the water content or atmospheric humidity of the air in contact with the skin decreases. The greatest disparity exists when the skin is exposed to dry windy weather.

It is apparent that where moisture is lost from the stratum corneum at a rate faster than it is released and replenished by the dermis, the stratum corneum becomes dry and tends to become rough and cracked.

The body itself provides a mechanism by which it attempts to alleviate this problem and this mechanism operates through the natural secretions of the skin. The sebaceous glands which are located around the individual hair follicles continuously secrete a material known as sebum, which travels up each hair follicle to

the surface of the skin, and spreads out over the outer surface of the skin to form a thin, oily layer. The presence of the thin layer of sebum tends to reduce the rate of moisture loss from the stratum corneum. However, under conditions of low atmospheric humidity and particularly when such low humidity is combined with high velocity air currents across the skin, as in exposure to high winds, even the presence of the natural layer of sebum fails to reduce the rate of moisture loss from the stratum corneum to a value equal to the rate at which moisture migrates from the dermis into the stratum corneum. In addition, the rate of production of sebum tends to fall off with increasing age with the result that older people tend to have increasing difficulty with the problem of dry skin. Also, there are some individuals whose normal rate of secretion of sebum from the sebaceous glands is ordinarily too low to provide an effective degree of natural protection against moisture loss even under average atmospheric conditions where the humidity is in the normal range.

Various materials have been used in the past in an attempt to reduce the rate of moisture loss from the stratum corneum. Typical of such materials are lanolin and petrolatum. The barrier action resulting from the application of these materials to the skin does lessen the rate of moisture loss from the stratum corneum but it is well recognized that these materials are not entirely compatible with the natural secretions of the skin. Their use results in the clogging of the pores of the skin and also inhibits the flow of sebum to the surface of the skin. These are obvious disadvantages.

It is, therefore, an important object of this invention to provide a skin conditioning composition which when applied in the usual fashion can retard the ordinary moisture loss of the skin.

A further object of this invention is to provide a skin conditioner which not only lessens the rate of moisture loss but which is both compatible and miscible with the natural secretions from the skin.

Other objects and advantages of this invention will become apparent from the following detailed description.

In accordance with this invention, it has now been found that the rate of moisture loss from the skin can be retarded by the application to the skin of a new and novel conditioner which comprises substantially 50 to 70 per cent by weight of a mixture of triglycerides comprising substantially 45 to 65 percent by weight of saturated triglycerides of higher fatty acids and substantially 55 to 35 per cent by weight of unsaturated triglycerides of higher fatty acids, said acids having 12 to 18 carbon atoms, substantially 15 to 30 per cent by weight of wax comprising the esters of higher fatty acids having 10 to 32 carbon atoms with higher aliphatic monohydric alcohols having 14 to 32 carbon atoms and substantially 10 to 25 per cent by weight of higher molecular weight hydrocarbons containing from 10 to 60 carbon atoms, substantially 30 to 70 per cent by weight of said hydrocarbons consisting of squalene, and if desired some sterols, sterol esters, or mixtures thereof. The conditioners obtained are highly effective in retarding the rate of moisture loss from the skin and have the added advantage of being compatible with the natural secretions of the skin, thereby not only complementing but also combining with and enhancing the effectiveness of the natural secretions.

Said novel composition may be used in conditioning of the skin in order to retard the rate of moisture loss therefrom. In utilizing this method the conditioner may be applied to the skin either alone or in admixture with a cosmetic carrier and any convenient form may be employed such as ointments, lotions, creams, sprays, or sticks. The admixture of said skin conditioner with a suitable cosmetic carrier, as described, also represents a new and novel composition of matter for conditioning the skin and reducing the rate of moisture loss therefrom.

Other novel aspects of this invention which relate to more specific formulations of said conditioners will become apparent from the following description.

It has been found that conditioners in which the triglycerides are held within the range of 55 per cent to 65 per cent by weight are particularly effective. The triglycerides used should be of fatty acids having from 12 to 18 carbon atoms, although minor amounts of triglycerides of fatty acids outside of this range may be used without adversely influencing the performance of the conditioner.

Suitable saturated triglycerides include the triglycerides of myristic acid, palmitic acid and stearic acid and the unsaturated triglycerides which are useful include those of mono-unsaturated fatty acids such as palmitoleic and oleic acids, as well as of acids with more

than one double bond per molecule, such as linoleic and linolenic acids. Mixed triglycerides, that is, where the acid moieties of different fatty acids appear in a single triglyceride molecule, are also effective.

The triglycerides may be derived from natural sources such as the naturally occurring animal and vegetable oils or can be prepared synthetically. It has been found that certain naturally occurring animal and vegetable oils have the proper proportions of saturated and unsaturated triglycerides of fatty acids having the desired number of carbon atoms and these oils are particularly convenient sources of the saturated and unsaturated triglyceride component in the conditioners of this invention. Useful natural oils and fats which may be formulated into conditioners of this invention are cocoa butter, lard, palm oil, beef tallow, mutton tallow, Chinese tallow, hydrogenated coconut oil, hydrogenated cotton seed oil, sperm body oil, or sperm head oil. The cotton seed oil may be hydrogenated to yield a mixture of about 50 per cent saturated and 50 per cent unsaturated fatty acid triglycerides. Beef tallow also has approximately 50 per cent saturated and 50 per cent unsaturated fatty acid triglycerides. Accordingly it has been found that hydrogenated cotton seed oil, beef tallow, or mixtures thereof, are a useful source of the major portions of the triglycerides required in formulating the conditioners of this invention.

The conditioners also comprise about 15 to about 30 per cent by weight of a saturated or unsaturated wax or a mixture of such waxes, with a range of 20 to 25 per cent being particularly effective. The waxes used in the conditioners of this invention are preferably the saturated and unsaturated esters of higher fatty acids with monohydric aliphatic alcohols. The acid moiety of the esters has a carbon content of 10 to 32 carbon atoms. The esters may be saturated or unsaturated. The alcohol moiety may have a carbon content of 14 to 32 carbon atoms and may be saturated or unsaturated. Both the acid and alcohol moieties may be straight chain or branched chain radicals.

Useful saturated waxes, therefore, include ceryl palmitate, stearyl stearate, myristyl behenate, myricyl cerotate, arachyl melissate, ceryl cerotate, ceryl palmitate, or pisangceryl carnaubate. Useful unsaturated waxes include oleyl oleate, palmitoleyl palmitate, oleyl cerotate, or myristyl oleate with either the acid moiety, or the alcohol moiety or both may be unsaturated.

The waxes used in formulating the conditioner may be derived from naturally occurring animal and vegetable waxes such as beeswax, spermaceti wax, sperm oil, carnauba wax, Chinese insect wax, or banana wax, since these natural waxes contain large proportions of the desired esters.

The consistency or fluidity of the conditioner can be varied by proper selection of the wax used in formulating the conditioners. Conditioners where the wax content is derived solely from unsaturated waxes tend to be more fluid than conditioners where all or a portion of the wax content is made up of saturated waxes. It has been found that the unsaturated wax oleyl oleate and the saturated wax cetyl palmitate are particularly useful in formulating the conditioners of this invention. A conditioner in the form of a soft paste comprising 23 percent by weight of oleyl oleate may readily be reformulated as a hard waxy solid by replacing half of the oleyl oleate with cetyl palmitate. Thus, the physical properties of the conditioners prepared in accordance with this invention can be readily adjusted by varying the relative proportions of saturated and unsaturated waxes used.

The conditions also comprise about 10 to about 25 per cent by weight of the higher molecular weight hydrocarbons and of this component between about 30 per cent and about 70 per cent is squalene. These higher hydrocarbons may be straight chain, branched chain, or cyclic, saturated or unsaturated, with a carbon content of between 16 and 60 carbon atoms. Squalene, which is a highly unsaturated hydrocarbon containing 30 carbon atoms, is a particularly desirable component since this compound is known to occur in the natural secretions from the skin. The use of squalene in these conditioners is effective in insuring a suitable degree of compatibility of the conditioner with the natural secretions of the skin. Squalene is believed to be a key intermediate in the natural synthesis of vitamin D. Thus, the presence of squalene in the conditioner further insures that the skin treated in accordance with this invention will have an adequate supply of this vital compound should the natural skin secretions be at a low level.

The consistency and fluidity of the conditioner can also be adjusted by varying the molecular weight of those hydrocarbons which are used in addition to the squalene in the formulation of the conditioners. Thus, the selection of the hydrocarbon used by its molecular weight offers another method of adjusting and varying the physical characteristics of the conditioner to obtain the desired consistency. The higher molecular weight hydrocarbons are desirable when formulating the harder conditioners, while the C16 to C24 hydrocarbons are useful in formulating the softer and more liquid conditioners. It has been

found that petrolatum and mineral oil are particularly useful as higher and C16 to C24 hydrocarbons, respectively, for use in formulating the conditioners of this invention. For example, a conditioner in the form of a soft paste comprising 7 per cent by weight of petrolatum may be readily reformulated as a liquid by substituting mineral oil for the petrolatum in the formulation. The selection of the hydrocarbon by its molecular weight can be combined with the choice of a particular saturated or unsaturated wax as an effective means for adjusting the consistency of the conditioner to any desired degree.

The conditioner may also comprise up to 10 per cent by weight of a sterol, such as cholesterol, dihydrocholesterol, 7-oxocholesterol, dihydrolanosterol, cholest-7-en-3-ol, cholestan 3,5,6-triol, or agnosterol, lanosterol, or esters of sterols such as those listed above with fatty acids or mixtures of sterols and sterol esters. The sterols and sterol esters are formed in the body by biochemical syntheses and are present in small amounts in the natural secretions from the skin.

To produce the desired protective effect, the conditioner is applied to the skin in the form of a thin, uniform layer either by itself, or admixed with a cosmetic carrier to form a cosmetic skin conditioning composition. When used in admixture with a cosmetic carrier, the composition may normally contain from 1 to about 60 per cent conditioner by weight, with the proportion of conditioner in the composition being influenced by the desired physical form of the composition and by its intended use. Useful cosmetic carriers include the conventional mixtures used in the production of lotions, oils, creams, ointments, or lipsticks with a result that the skin conditioning composition can be in various physical forms ranging from liquid to solid. The skin conditioning composition can comprise in addition to the conditioner any of the conventional skin treating ingredients such as germicides, fungicides, or ultra-violet screening compounds to form skin conditioning compositions with the particular properties imparted by the added skin treating ingredient as well as the ability to retard the rate of moisture loss from the skin due to the presence of the conditioner.

The following examples are included to further illustrate the present invention, and show the formulation of the conditioner as well as various skin conditioning compositions comprising the conditioner.

WFO 25p

EXAMPLE I

The following materials were blended in the proportions indicated.

| | Per Cent by Weight |
|--------------------|--------------------|
| Beef tallow | 58.5 |
| Oleyl Oleate | 23 |
| Petrolatum | 7 |
| Squalene | 7 |
| Cholesterol esters | 3.5 |
| Cholesterol | 1 |

A conditioner in the form of a soft paste is produced.

EXAMPLE II

The following materials were blended in the proportions indicated.

| | Per Cent by Weight |
|--------------------|--------------------|
| Beef tallow | 58.5 |
| Oleyl Oleate | 11.5 |
| Cetyl palmitate | 11.5 |
| Petrolatum | 7 |
| Squalene | 7 |
| Cholesterol esters | 3.5 |
| Cholesterol | 1 |

A skin conditioner in the form of a hard waxy solid is produced.

EXAMPLE III

The following materials were blended in the proportions indicated.

| | Per Cent by Weight |
|--------------------|--------------------|
| Beef tallow | 58.5 |
| Oleyl Oleate | 23 |
| Mineral Oil | 7 |
| Squalene | 7 |
| Cholesterol esters | 3.5 |
| Cholesterol | 1 |

A liquid skin conditioner is produced.

The foregoing examples illustrate skin conditioners having a wide variation in viscosity or consistency which may be produced in accordance with this invention by merely varying the type of wax used in formulating the conditioner and by suitable choice in the selection of the molecular weight of the hydrocarbon used. Thus, the composition of Example I wherein all the wax present is an unsaturated wax, the resulting conditioner composition is a soft paste. In Example II half the wax is unsaturated and the other half saturated with the result that a hard composition is obtained. By replacing the petrolatum used in the composition of Example I with C16 to C24 mineral oil, the fluid composition of Example III is obtained.

The compositions of Examples I, II and III were evaluated for their effect in reducing the rate of moisture loss from the skin by the following procedure: Desiccators were fabricated from short sections of 28 millimetre glass tubing. 40 mesh stainless steel screen discs were sealed to the glass at the centre of each cylinder with porcelain cement. Silica gel was placed on the stainless steel screens and the top of each desiccator was capped with a snug-fitting polyethylene snap cover. The bottom of each desiccator was closed with a polyethylene cap with a 25 millimetre hole cut in the centre. In carrying out the test the composition to be tested is applied over a small area of the skin of the forearm with a micro spatula in an amount of between 5 and 6.25 milligrams per square centimetre. Two desiccators were weighed, and then one placed over the area of the skin covered by the composition to be tested, and the other placed over an adjacent untreated area of the skin to serve as a control. Both desiccators were held firmly in place by means of elastic straps. At the end of two hours the desiccators were removed from the skin and again weighed. The increase in weight for each desiccator represents the amount of moisture released from the skin and absorbed by the silica gel during the two hour test period. By comparing the rate of moisture loss from the untreated skin with the rate of moisture loss from the treated area of the skin it is possible to calculate the percentage reduction in the rate of moisture loss as a result of application to the skin of the skin conditioner. The results of tests carried out with the compositions of Examples I, II and III indicated a reduction in rate of moisture loss from the skin of between 20 per cent and 30 per cent. The greatest reduction was observed with the

composition of Example II which is a solid material and the smallest reduction with the composition of Example III which is a liquid.

EXAMPLE IV

The same ingredients as used in the preparation of Example I were blended except that a mixture 53.2 parts of hydrogenated cotton seed oil and 5.3 parts of hydrogenated coconut oil were used in place of the 58.5 parts of beef tallow. The resulting composition is in the form of a soft paste.

Similarly, a mixture of 53.2 parts hydrogenated cotton seed oil and 5.3 parts hydrogenated coconut oil were used in place of the beef tallow in preparing compositions similar to those of Examples II and III. The physical properties of the resulting compositions are similar to those of the compositions of Examples II and III respectively.

EXAMPLE V

The same ingredients used in the preparation of Example I were blended except that a mixture of 5.3 parts hydrogenated coconut oil, 5.3 parts hydrogenated cotton seed oil and 47.9 parts beef tallow were used in place of the 58.5 parts of beef tallow in the preparation of Example I. A skin conditioner in the form of a soft paste is produced.

In a similar way, a blend of 5.3 parts of hydrogenated coconut oil, 5.3 parts of hydrogenated cotton seed oil and 47.9 parts of beef tallow were used in place of the 58.5 parts of beef tallow used in preparing the compositions of Examples II and III. The resulting skin conditioners had the same physical properties as the compositions of Examples II and III.

In the conditioners described in the foregoing examples the beef tallow, hydrogenated cotton seed oil and hydrogenated coconut oil represented the source of the saturated and unsaturated triglycerides required. The saturated triglycerides are primarily those of fatty acids having from 16 to 18 carbon atoms with minor amounts of the triglycerides of fatty acids having 8, 10, 12 and 14 carbon atoms. The unsaturated triglycerides are predominantly those of unsaturated 18 carbon atom fatty acids. In the skin conditioners represented in the foregoing examples, the triglycerides comprise about 43 to about 47 per cent unsaturated triglycerides and about 57 to about 53 per cent saturated triglycerides.

The following examples illustrate compositions for conditioning the skin which comprise the conditioner in combination with a cosmetic carrier.

EXAMPLE VI

| Hand Lotion (Anionic) | Per Cent by Weight |
|---|--------------------|
| Conditioner of Example III | 1.00 |
| Glycerin | 2.00 |
| Potassium Hydroxide (100%) | 0.17 |
| Stearic Acid | 1/.66 |
| Oleic Acid | 0.84 |
| Ethylene Glycol Monostearate | 2.50 |
| Water, perfume, color and preservative | q.s. to 100.00 |

EXAMPLE VII

| Vanishing Cream (Anionic) | Per Cent by Weight |
|---|--------------------|
| Conditioner of Example II | 15.0 |
| Stearic Acid | 15.0 |
| Glycerin | 12.0 |
| Potassium hydroxide (100%) | 1.2 |
| Polyethylene glycol (Mol. Wt. = 1500) | 5.0 |
| Diethylene glycol monolaurate | 2.0 |
| Perfume, color, preservative and water | q.s. to 100.00 |

EXAMPLE VIII

| Lubricating Lotion | Per Cent by Weight |
|--|--------------------|
| Conditioner of Example I | 15.00 |
| Glyceryl Monostearate | 4.00 |
| Stearic Acid | 1.50 |
| Sodium lauryl sulphate | 1.00 |
| Sorbitol (70% Solution) | 8.00 |
| Water, preservative, color, and perfume | q.s. to 100.00 |

EXAMPLE IX

Night Cream

| | Per Cent by Weight |
|------------------------------|--------------------|
| Conditioner of Example I | 25.00 |
| Isopropyl Stearate | 25.00 |
| Sorbitan sesquioleate | 3.00 |
| White wax | 10.00 |
| Lanolin alcohols | 5.00 |
| Water, preservative, perfume | q.s. to 100.00 |

EXAMPLE X

Treatment Cream

| | Per Cent by Weight |
|------------------------------|--------------------|
| Conditioner of Example III | 50.00 |
| Sorbitan sesquioleate | 3.00 |
| White wax | 10.00 |
| Lanolin alcohols | 5.00 |
| Water, preservative, perfume | q.s. to 100.00 |

EXAMPLE XI

Lipstick

| | Per Cent by Weight |
|---------------------------|--------------------|
| Conditioner of Example II | 4.2 |
| Castor Oil | 44.6 |
| Mineral Oil | 20.1 |
| Candelilla Wax | 5.3 |
| Ozokerite Wax | 2.3 |
| Paraffin Wax | 4.2 |
| Isopropyl Stearate | 2.5 |
| Carnauba Wax | 3.4 |
| Colour | 12.6 |
| Perfume | 0.8 |
| | 100.0 |

The application of the conditioner of this invention to the skin is effective in conditioning and softening the skin, and in retarding the rate of moisture loss therefrom, the conditioner is compatible with the natural secretions of the skin and accordingly is particularly effective since it combines with and enhances the effectiveness of the natural skin secretions. The application of the conditioner to the skin is particularly useful in people where the level of natural secretions from the skin is low. The effectiveness of various conventional cosmetic formulations such as lotions, creams, or oils can be enhanced substantially by the incorporation in the formulation of the conditioners of this invention.

WHAT WE CLAIM IS:—

1. A composition for conditioning the skin and retarding the rate of moisture loss therefrom which comprises substantially 50 to 70 per cent by weight of a mixture of triglycerides comprising substantially 45 to 65 per cent by weight of saturated triglycerides of higher fatty acids and substantially 55 to 35 per cent by weight of unsaturated triglycerides of higher fatty acids, said acids having 12 to 18 carbon atoms, substantially 15 to 30 per cent by weight of wax comprising the esters of higher fatty acids having 10 to 32 carbon atoms with higher aliphatic monohydric alcohols having 14 to 32 carbon atoms and substantially 10 to 25 per cent by weight of higher molecular weight hydrocarbons containing from 10 to 60 carbon atoms, substantially 30 to 70 per cent by weight of said hydrocarbons consisting of squalene, and if desired, some sterols, sterol esters, or mixtures thereof.

2. A composition according to claim 1, wherein said composition includes up to 10 per cent by weight of sterols, sterol esters or mixtures thereof.

3. A composition according to claim 1 or 2 wherein said hydrocarbons contain 16 to 60 carbon atoms.

4. A composition according to any one of the preceding claims wherein said mixture of triglycerides is derived from beef tallow, hydrogenated cotton seed oil or mixtures thereof; the said wax is oleyl oleate, cetyl palmitate or mixtures thereof, and said hydrocarbons are mineral oil, petrolatum or mixtures thereof, substantially 30 to 70 per cent by weight of the hydrocarbons consisting of squalene.

5. A composition according to any one of the preceding claims in the form of a soft paste for conditioning the skin and retarding the rate of moisture loss therefrom which com-

prises about 58.5 per cent by weight of beef tallow, about 23 per cent by weight of oleyl oleate, about 7 per cent petrolatum, about 7 per cent by weight of squalene, about 3.5 per cent by weight of cholesterol esters, and about 1 per cent by weight of cholesterol.

6. A composition according to any one of claims 1—4, in the form of a waxy solid for conditioning the skin and reducing the loss of moisture rate therefrom which comprises about 58.5 per cent by weight of beef tallow, about 11.5 per cent by weight of oleyl oleate, about 11.5 per cent by weight of cetyl palmitate, about 7 per cent by weight of petrolatum, about 7 per cent by weight of squalene, about 3.5 per cent by weight of cholesterol esters, and about 1 per cent by weight of cholesterol.

7. A liquid composition according to any one of claims 1—4 for conditioning the skin and reducing the rate of moisture loss therefrom which comprises 58.5 per cent by weight of beef tallow, about 23 per cent by weight of oleyl oleate, about 7 per cent by weight of mineral oil, about 7 per cent by weight of squalene, about 3.5 per cent by weight of cholesterol esters, and about 1 per cent by weight of cholesterol.

8. A composition according to any one of claims 1—4 for conditioning the skin and retarding the rate of moisture loss therefrom which comprises a cosmetic carrier and about 1 to about 60 per cent by weight of a conditioner comprising about 50 to about 70 per cent by weight of a mixture of triglycerides comprising substantially 45 to 65 per cent by weight of saturated triglycerides of higher fatty acids having 12 to 18 carbon atoms and substantially 55 to 35 per cent by weight of unsaturated triglycerides of higher fatty acids, substantially 15 to 30 per cent by weight of wax comprising the esters of higher fatty acids having 10 to 32 carbon atoms with higher aliphatic monohydric alcohols having 14 to 32 carbon atoms and substantially 10 to 25 per cent by weight of higher molecular weight hydrocarbons containing from 10 to 60 carbon atoms, substantially 30 to 70 per cent by weight of said hydrocarbons consisting of squalene.

9. A composition for conditioning the skin in accordance with claim 1 substantially as described herein with reference to the Examples.

STEVENS, LANGNER, PARRY
& ROLLINSON,
Chartered Patent Agents,
Agents for the Applicants.